

Differences in Mathematical Communication Skills Using *Draft Pocket Books* and Domino-Based Cards PMR

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Abstract— This study aims to find out: Differences in ability Communication skills that use *pocket pocket machines* and those using PMR-based This study is a quasi-experimental study. The population of this study were students of class VII 239 TA 2017/2018. Sample selection is done by simple *random sampling* by randomizing the class. The instrument used consisted of: communication skills test and problem solving ability with student activity sheets. Data in this study were analyzed using descriptive statistical analysis and inferential analysis. Inferential analysis of data is carried out using the t-test. The results showed that there were differences in communication ability using a *draft pocket book* and a PMR-based domino card. It is based on t-test analysis results for the model obtained t_{hitung} 3,006 and t_{tabel} 2,056 sig = 0.004. where is the value of this sig that is Criteria 0.05.

Keywords—Communication Ability; Book Draft Pocket; dominoes; Bebasis PMR

I. INTRODUCTION

Researchers still conduct research observations of many teachers who embrace the paradigm of *transfer of knowledge* Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines of advancing human thinking power. Therefore mathematics is very important to learn, as expressed by Cornelius (Aburrahman, 2003). Five reasons for the need to learn mathematics include: 1) a clear and logical means of thinking; 2) means to solve problems in everyday life; 3) means of recognizing relationship patterns and generalizing experiences; 4) means to develop creativity; and 5) means to increase awareness of cultural development [1].

Understanding Communication is a process of formation, delivery, acceptance and processing of messages that occur within a person and or between two or more with a specific purpose. As Lasswell (Daryanto, 2013) says that communication is something related to "who said or expressed

what, with what communication channels, to whom and with what impact or results achieved. communication is the process of delivering information or messages among several people and aims to invite people to understand what we convey in achieving the goal [2]. According to Mohammda Zain in Milman (Yusdi, 2011) means that Ability is ability, ability, strength we strive with ourselves. Communication in mathematics is related to students' abilities and skills in communicating. Evaluation standards for measuring these abilities are (1) Expressing mathematical ideas by speaking, writing demonstrations, and describing them in visual form, (2) understanding interpreting, and assessing mathematical ideas presented in writing, oral or visual forms, (3) using vocabulary word / language, mathematical notation and structure to express ideas, describe relationships, and model making [3]. This means mathematical communication is the integration between understanding thematically (*and doing to knowing and doing mathematics*). Meanwhile, mathematical communication as a verbal explanation of mathematical reasoning measured through three dimensions, namely truth (*correctness*), fluency in providing various correct answers to mathematical representations, in formal form, visual, algebraic equations, and diagrams.

Mathematical communication skills can occur when students learn in groups, when students explain algorithms to solve an equation, when students present a unique way to solve problems, when students construct and explain a physical representation of real-world phenomena, or when students provide a construct about images - geometry drawings.

Understanding Problem Solving Problem solving is part of the mathematics curriculum which is very important because in the learning process as well as the completion of the students it is possible to gain experience using the knowledge and skills already possessed to be applied to problem solving. (Suryadi, 2000) states that problem solving ability is a very important activity in solving students trying to answer

questions or solve problems, they are also motivated to work hard. Problem solving ability is the process of applying knowledge that has been obtained previously into new situations that are not yet known, learning mathematics [4].

Understanding Realistic Mathematics learning is a concept or procedure used in discussing a lesson material. A realistic mathematical approach (PMR) is the delivery of a mathematical topic that starts from things that are real or have been experienced by students before. Realistic mathematics learning is basically utilizing the reality and environment that is understood by students to expedite the learning process of mathematics so as to achieve the goals of mathematics education better than before

(Asrin Lubis, 2006) Realistic Mathematics (PMR) is an approach to learning mathematics that utilizes objects or environment as teaching aids as a material utilizing the reality that exists around the social environment of students so that learning mathematics can be more easily understood by students [5]. And according to Edi Shahputra (2013), that in general a realistic mathematical approach consists of five characters, namely: (1) the use of "real context" (2) the use of "models" (3) the linkages in and between mathematical topics; (4) Use of interactive methods and (5) appreciate variations in student answers and contributions [7].

The Pocket Book draft with pictures and interesting appearance can influence student learning outcomes. In accordance with the statement of James W. Brown, et al which states that from some of Edmund Faison's research results on the use of images shows that to obtain maximum learning results, the pictures must be closely related to learning material

Domino cards a kind of game that can be done on the floor or table using pieces wood or paper as much as 28 pieces according to Muh Taufiqurrohma (2012) "Domino card games are two square numbers including pairing one-to-one activities in general a two-square number game device consisting of 28 cards, but the number of cards can be changed according to need. Materials used as thick paper bases such as cards or manila "[8]

Domino cards packaged in the form of educational games are expected to make the learning process more interesting and students actively involved in learning activities. A domino card is a card made of thick rectangular paper with certain material written on it. And according to Heksanti (2012) "The permanent media of dominoes is an intermediary used in games using paper which is formed at a certain size which consists of a collection of numbers that have meaning to achieve learning objectives" so that the media of domino card games makes it easy for students to solve mathematical problems and provide understanding of mathematical concepts in play so that students do not feel bored and bored [9].

II. METHOD

This study aims to find out the differences in communication skills and problem solving abilities taught by using *draft pocket book* and PMR-based domino cards.

Research Design The design of this study was in the form of a non-equivalent control group design

TABLE 1. Research Design

Group	Treatment	Posttest
Experiment 1	P ₁	O
Experiment 2	P ₂	O

Where:

Experiment-1: Class Using a PMRbased domino card

Experiment-2: Class using a *draft pocket book*based on PMR

P₁: Treatment using dominoes based on PMR

P₂: Treatment using a *draft pocket book*based on PMR

O: Posttest in experimental class-1, experiment-2

A. Research Instrument

This study used two types of instruments, namely test instruments. Test instruments in the form of communication skills tests and problem solving skills

B. Instrument Testing

Before the research instrument was used, the contents of all test devices were validated and analyzed by three lecturers and two teachers of mathematics subjects. Content validity is determined based on the suitability between the question grid and the item.

After expert validation of the research instrument, then the instrument with sufficient content validity was tried out to students who were outside the research sample. This is done to see the validity, reliability.

C. Inferential Statistical

Analysis Analysis of the parameters of the use used to see the difference in the ability of the communication capability of the experiment-1 class, experiment-2 class.

TABLE 2. Communication capability

Communication ability	Group	Number of Students	Minimum	Maximum	Mean	Standard Deviation
	Experiment-1	28	22.00	54.00	40.6071	8.43423
	Experiment-2	28	27.00	47.00	34.7857	5.82051

III. RESULT AND DISCUSSIONS

To answer the research questions raised in the introduction, an analysis and interpretation of results data is needed research. The analysis in question is to find out the differences in communication ability and students' problem solving ability in fraction material, the experimental-1 class is taught using a domino based on PMR and experiment-2 which is taught by

using *pocket pocket book*. a PMR-based-soal communication skills and students' mathematical problem solving abilities.

A. Research Results The

Data analyzed were the results of the post test. communication skills, and students' mathematical problem solving skills. Post test results of communication skills and students' problem solving abilities in mathematics learning are taught using PMR-based dominoes and students who are taught using *draft pocket books* PMR-based. followed by 28 students in the experimental class 1 and 28 students in the experimental class 2.

B. Description of Research Results Mathematical Communication Ability and Students' Mathematical Problem Solving Ability

After calculating the post test results of mathematical communication skills and problem solving abilities in both experimental class 1 and the experimental class 2 can be seen in the attachment. The conclusion of the description of the results of the minimum, maximum, average, mean and standard deviation values as follows.

Based on the above table it can be seen that the minimum in experiment-1 22.00 and in experiment-2 27.00 with the maximum on experiment-1 54.00 and on experiment-2 47.00 From the summary of the above communication skills can be seen that in experiment-1 and experiment-2 there are differences significant between communication skills using the *draft pocket book* and domino cards.

TABLE 3 . Average of Mathematical Communication Ability Experiment-1 Siswa kelas and Experiment-2

The group	N	Mean	Std. Deviation	Std. Error Mean
Experiment 1 and Experiment 2	28	40.6071	8.43423	1.59392
Experiment-2	28	34.7857	5.82051	1.09997

Based on the above table it can be seen that experiment-1 with mean 40.6071 and experiment-2 34.7857 with standard deviation in eksperiment-1 class 8.43423 and in ekspreimen-2 class 5.82501 with a standard error of 1.59392 at experiment-1 and in experiment-2 1.09997.

TABLE 4 Analyst Students' Mathematical Communication Ability With t-Test

	Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
Equal variances assumed	4.103	.048	3.006	54	.004	5.82143	1.93663	1.93873	9.70413	
Equal variances not assumed			3.006	47.963	.004	5.82143	1.93663	1.92750	9.71538	

Based on the table 4 it can be seen that with table f 4.130 with significant 0.048 with t table on experiment-1 3,006 on experiment-2 3,006 with standard error 1,93663.

Hypotsis research 1:

H_0 : Communication Ability using PMR-based dominoes.

H_a : Communication Ability using the PMR-based Pocket Book Draft.

Hypothesis Statistics

$H_0: \mu_1 \leq \mu_2$ (1)

$H_a: \mu_1 > \mu_2$ (2)

Where:

μ_1 : Communication Ability using cards. domino based on PMR

μ_2 : Communication capability problems using the Draft pocket book based on PMR.

Testing Criteria are.

f $sig < 0,05$ rejected H_0 or $t_{hitung} > t_{tabel}$ then H_0 rejected if the value $sig \geq 0,05$, then H_0 is received or the value of

$t_{hitung} > t_{tabel}$ then Based on table 4.11 above is obtained the value of t_{hitung} 3,006 an t_{tabel} sig = 0.004 where this sig value is

0.05, so there is a significant difference between communication skills using PMR-based dominoes and students taught using the *draft pocket book*.

IV. CONCLUSIONS

Based on the results of the implementation and analysis of research data conducted on MTS students of class VII Pesantren Mawaridussalam Medan in 2017/2018 academic year, the results showed that there were significant differences in students' mathematical communication skills taught using dominoes than students taught using *ratherdraft pocked books* . The details of the conclusions are as follows.

1. Mathematical Communication Ability of students taught using dominoes based on PMR is higher than students taught using *draft pocked books* PMR-based.
2. Mathematical Problem Solving Ability students taught using domino cards based on PMR are higher than students taught using *draft pocked books* PMR-based
3. Analysis of students' answers to errors taught using PMR-based dominoes is higher than students taught using *draft pocked books* PMR-based.
4. Analysis of students' answers to errors taught by using dominoes based on PMR is higher than students taught using *draft pocked books* PMR-based.

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